

REMARKS

This is intended as a full and complete response to the Final Office Action dated January 30, 2008, having a shortened statutory period for response set to expire on April 30, 2008. Please reconsider the claims pending in the application for reasons discussed below.

Claims 1, 2, 4-13, 15, 16, 19-33 and 37 are pending in the application and stand rejected by the Examiner. These rejections are respectfully traversed.

Claims 1, 2, 4-7, 9-12, 16, 19, 20, 26, 27 and 32, 33 and 37 stand rejected under 35 U.S.C. § 103(a) as unpatentable over *Rubino, et al.* (U.S. Patent No. 5,527,215) in view of *Osterheld et al.* (5,921,855).

Claims 1, 15, 16, 19, 28, 32 and 37 have been amended to clarify the subject matter as previously presented in the claims and which describes the limitation of a groove depth of at least one of the non-intersecting fluid retaining grooves changing along a length of the fluid retaining groove. This limitation includes the example of a sloped or tapered groove (as shown in Figure 10) and, thus, no new issues are raised which may require further consideration or search.

Regarding claims 1, 16, 19, 32, and 37, *Osterheld et al.* teaches a polishing pad (32) having concentric (or spiral) grooves (100) that are uniformly spaced with a pitch P which is the radial distance between adjacent grooves (100) wherein each groove may have a depth D_g and a width W_g (see Col. 5 lines 24-32). The groove depth D_g may be between about 0.02 and 0.05 inches (see Col. 5 lines 66-67). The depth of the grooves (100) may be increased to improve polishing pad lifetime (see Col. 6 lines 66-67; Col. 7 lines 1-4).

Osterheld et al. does not teach, show, suggest, or otherwise make obvious grooves which are sloped or tapered so that the groove depth changes along a length of the fluid retaining groove to facilitate slurry delivery control to a particular area of the polishing pad (see p.11 lines 12-25 and Figure 10 of the present application).

Therefore, the combination of *Rubino, et al.* with *Osterheld et al.* does teach, show, suggest, or otherwise make obvious an apparatus, comprising a semiconductor polishing device having a first surface defining at least two non-intersecting fluid

retaining grooves at least a portion of which is oriented at an angle relative to a radial line originating at a center of the semiconductor polishing device, wherein the non-intersecting fluid retaining grooves are adapted to flow a fluid inwardly toward a center portion of the semiconductor polishing device, and wherein at least one of the non-intersecting fluid retaining grooves is sloped so that a groove depth changes along a length of the at least one non-intersecting fluid retaining groove, as recited in claim 1 and claims dependent thereon.

Also, the combination of *Rubino, et al.* with *Osterheld et al.* does not teach, show, suggest, or otherwise make obvious a substrate polishing pad, comprising: (a) a polishing surface on a first side of the substrate polishing pad; and (b) a mounting surface on a second side of the substrate polishing pad, wherein at least one of the polishing surface and the mounting surface has a plurality of non-intersecting fluid retaining grooves formed therein, wherein the grooves are disposed so that upon a given direction of movement of the substrate polishing pad a fluid disposed in the grooves is urged to flow from an outer portion toward a center portion of the substrate polishing pad, wherein the one or more fluid retaining grooves extend from the center portion of the substrate polishing pad to an edge of the substrate polishing pad, and wherein no point of the grooves is tangent to a radial line extending from a center to the substrate polishing pad, and wherein at least one of the non-intersecting fluid retaining grooves is sloped so that a groove depth changes along a length of the at least one non-intersecting fluid retaining groove, as recited in claim 15.

Also, the combination of *Rubino, et al.* with *Osterheld et al.* does not teach, show, suggest, or otherwise make obvious t a substrate polishing pad, comprising: (a) a polishing surface on a first side of the substrate polishing pad; and (b) a mounting surface on a second side of the substrate polishing pad, wherein at least one of the polishing surface and the mounting surface has a plurality of non-intersecting fluid retaining grooves formed therein, wherein the grooves are disposed so that upon a given direction of movement of the substrate polishing pad a fluid disposed in the grooves is urged to flow from an outer portion toward a center portion of the substrate polishing pad, and wherein the grooves are formed on the mounting surface and the substrate polishing pad comprises perforations extending between the polishing

surface and the mounting surface, and wherein at least one of the non-intersecting fluid retaining grooves is sloped so that a groove depth changes along a length of the at least one non-intersecting fluid retaining groove, as recited in claim 16.

Also, the combination of *Rubino, et al.* with *Osterheld et al.* does not teach, show, suggest, or otherwise make obvious an apparatus for polishing a substrate, comprising: (a) one or more rotatable platens; (b) a motor coupled to the rotatable platens; (c) one or more polishing heads rotatably mounted in facing relation to the rotatable platens; and (d) a polishing pad disposed on each of the rotatable platens, wherein at least one of the rotatable platens and the polishing pads comprise a plurality of non-intersecting fluid retaining grooves formed on a first surface thereof and wherein at least a portion of the grooves are disposed at an angle to a radial line extending from a center of the first surface and are adapted to flow a fluid inwardly from an outer portion to a center portion of the first surface, and wherein at least one of the non-intersecting fluid retaining grooves is sloped so that a groove depth changes along a length of the at least one non-intersecting fluid retaining groove, as recited in claim 19 and claims dependent thereon.

Also, the combination of *Rubino, et al.* with *Osterheld et al.* does not teach, show, suggest, or otherwise make obvious an apparatus, comprising a semiconductor polishing device having a first surface defining at least one non-intersecting fluid retaining groove at least a portion of which is oriented at an angle relative to a radial line originating at a center of the semiconductor polishing device, and wherein the non-intersecting fluid retaining groove has a first portion and a second portion having a same direction of curvature and defining a tangent point to the radial line and wherein the non-intersecting fluid retaining groove is adapted to flow a fluid inwardly toward a center portion of the semiconductor polishing device, and wherein the non-intersecting fluid retaining groove is sloped so that a groove depth changes along a length of the non-intersecting fluid retaining groove, as recited in claim 32 and claims dependent thereon.

Also, the combination of *Rubino, et al.* with *Osterheld et al.* does not teach, show, suggest, or otherwise make obvious an apparatus for polishing a substrate, comprising: (a) a rotatable platen; (b) a motor coupled to the rotatable platen; (c) a

polishing head rotatably mounted in facing relation to the rotatable platen; and (d) a polishing pad disposed on the rotatable platen, wherein a plurality of non-intersecting slurry retaining grooves are formed at an interface between the polishing pad and the rotatable platen and wherein a first portion of the grooves are oriented to flow slurry inwardly from an outer region to an interior region at the interface between the polishing pad and the respective rotatable platens for a given direction of rotation of the platen, and wherein a second portion of the grooves are oriented to flow slurry outwardly from a central region to the interior region at the interface between the polishing pad and the rotatable platen for the given direction of rotation of the platen, and wherein at least one of the non-intersecting fluid retaining grooves is sloped so that a groove depth changes along a length of the at least one non-intersecting fluid retaining groove, as recited in claim 37.

Regarding claims 2, 4-7, 9-12, 20, 26, 27 and 33, *Osterheld et al.* does not remedy the deficiency of *Rubino, et al.* for claims 1, 16, 19, 32, and 37. Therefore, *Rubino, et al.* in combination with *Osterheld et al.* does not teach, show, suggest, or otherwise make obvious the rejection matter of claims 1, 16, 19, 32, and 37 and claims 2, 4-7, 9-12, 20, 26, 27 and 33 dependent thereon.

Claims 28-31 are rejected under 35 U.S.C. 102(e) as being anticipated by *Beardsley et al.* (6,299,515).

Regarding claim 28, *Beardsley et al.* does not teach, show, suggest, or otherwise make obvious grooves which are sloped or tapered so that the groove depth changes along a length of the fluid retaining groove to facilitate slurry delivery control to a particular area of the polishing pad (see p.11 lines 12-25 and Figure 10 of the present application).

Therefore, *Beardsley et al.* does not teach, show, suggest, or otherwise make obvious a rotatable platen for a polishing system, comprising a patterned pad mounting surface forming a plurality of non-intersecting fluid retaining grooves each having a portion oriented at an angle relative to a radial line originating at a center of the pad, the portion adapted to flow a fluid inwardly from a perimeter portion to a center portion of the platen during rotation of the platen, and wherein at least one of the non-intersecting fluid retaining grooves is sloped so that a groove depth changes

along a length of the at least one non-intersecting fluid retaining groove, as recited in claim 28 and claims dependent thereon.

Claims 23 and 24 stand rejected under 35 USC §103(a) as being unpatentable over *Rubino, et al.* in view of *Beardsley, et al.* (6,299,515).

Beardsley, et al. does not remedy the deficiency of *Rubino, et al.* for claim 19. Therefore, *Rubino, et al.* in combination with *Beardsley, et al.* does not teach, show, suggest, or otherwise make obvious the rejection matter of claim 19 and claims 23 and 24 dependent thereon.

Claims 21, 22, 25 and 29 are rejected under 35 USC §103(a) as being unpatentable over *Meikle, et al.* (US Patent No. 5,698,455) in view of *Beardsley, et al.* and further in view of *Okamura, et al.* (US Patent No. 6,332,830).

Neither *Meikle, et al.* nor *Okamura, et al.* remedy the deficiencies of *Rubino, et al.* or *Beardsley, et al.* for claims 19 and 28. Therefore, *Meikle, et al.* in combination with *Beardsley, et al.* and *Okamura, et al.* and *Rubino, et al.* does not teach, show, suggest, or otherwise make obvious the rejection matter of claims 19 and 28 and claims 21, 22, 25 and 29 dependent thereon.

Having addressed all issues set out in the Final Office Action, Applicant respectfully submits that the claims are in condition for allowance and respectfully requests that the claims be allowed.

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Respectfully submitted,



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